

**REMARKS**

The Examiner rejected claims 1, 2, 7-13, 17-19, 20-23, 51-57 and 60-62 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai et al. (US 6,384,344) in combination with Chung (US 6,376,769).

The Examiner rejected claims 3-6, 58 and 59 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai (US 6,384,344) in combination with Chung (US 6,376,769) and Kinoshita (US 6,294,744).

The Examiner rejected claim 14 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai (US 6,384,344) and Chung (US 6,376,769) as applied to claim 1 and further in combination with Applicant's Admitted Prior Art (APA).

The Examiner rejected claims 15 and 16 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai (US 6,384,344), Chung (US 6,376,769) and APA as applied to claim 14 and further in combination with Bhatt (US RE37840).

The Examiner rejected claims 24 and 25 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai (US 6,384,344) and Chung (US 6,376,769) as applied to claim 22 and further in combination with Bhatt et al. (US RE37840E).

Applicants respectfully traverse the §103(a) rejections with the following arguments.

**35 U.S.C. §103(a): Claims 1, 2, 7-13, 17-19, 20-23, 51-57 and 60-62**

The Examiner rejected claims 1, 2, 7-13, 17-19, 20-23, 51-57 and 60-62 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai et al. (US 6,384,344) in combination with Chung (US 6,376,769).

Applicants respectfully contend that claim 1 is not unpatentable over Asai in combination with Chung, because Asai in combination with Chung does not teach or suggest each and every feature of claim 1. For example, Asai in combination with Chung does not teach or suggest "wherein the N dielectric layers each include a dielectric material having a stiffness of at least about 700,000 psi"

The Examiner admits that "Asia does not appear to explicitly show that PSI of the polyimide layer is at least about 700,000 PSI.". The Examiner argues that "Chung teaches polyimide with at least 700,000 PSI (Col. 2, Lines 10-12).... It would have been obvious to one of ordinary skill in the art to for the substrate of Asai with polyimide having at least 700,000 PSI in order to provide a polyimide as required by Asai (Col. 5, Lines 43-45)."

In response, Applicants offer the following arguments in rebuttal to the preceding argument by the Examiner for modifying Asai by the teaching of Chung.

A first argument by Applicants in rebuttal to the preceding argument by the Examiner is that Asai requires in col. 5, lines 43-45 that the polyimide be photosensitive, and the polyimide sheet mentioned by Chung in col. 2, lines 10-12 is not identified by Chung as being photosensitive.

A second argument by Applicants in rebuttal to the preceding argument by the Examiner is that Asai requires in col. 5, lines 43-45 that the polyimide have heat resistance, and the

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polyimide sheet mentioned by Chung in col. 2, lines 10-12 is not identified by Chung as having heat resistance.

A third argument by Applicants in rebuttal to the preceding argument by the Examiner is that Asai requires in col. 5, lines 43-45 that the polyimide have "high strength", but does not identify any measure of "high strength". The polyimide sheet mentioned by Chung in col. 2, lines 10-12 is not identified by Chung as having "high strength" but is instead identified by Chung as having a modulus of elasticity greater than 1,000,000 psi. A modulus of elasticity is a measure of stiffness and not of strength. Other material properties are measures of strength, such as tensile strength, yield strength, etc. In any event, Asai has not provided sufficient disclosure for a person of ordinary skill in the art to ascertain that Asai's requirement of "high strength" would be satisfied by a polyimide material having a high modulus of elasticity.

A fourth argument by Applicants in rebuttal to the preceding argument is that Chung in col. 2, lines 13-16 teaches away from using his identified polyimide sheet, since Chung states that "the use of such materials and conventional fabrication methods results in an increased cost that is undesirable and may require assembly processes that are more difficult or expensive to perform."

A fifth argument by Applicants in rebuttal to the preceding argument is that Chung in col. 2, lines 13-12 is not an enabling reference, since Chung does not identify any specific polyimide having a modulus of elasticity greater than 1,000,000 psi. Since there are thousands of different polyimides, Chung mention only of "polyimide" is not specific enough to for a person of ordinary skill in the art to identify which polyimides, of the thousands of possible polyimides, have a modulus of elasticity greater than 1,000,000 psi.

Based on the preceding arguments, Applicants respectfully maintain that claim 1 is not unpatentable over Asai in combination with Chung, and that claim 1 is in condition for allowance. Since claims 2, 7-13, 17-19, 20-23, and 51-53 depend from claim 1, Applicants contend that claims 2, 7-13, 17-19, 20-23, and 51-53 are likewise in condition for allowance.

**35 U.S.C. §103(a): Claims 3-6, 58 and 59**

The Examiner rejected claims 3-6, 58 and 59 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai (US 6,384,344) in combination with Chung (US 6,376,769) and Kinoshita (US 6,294,744).

As to claim 3, Applicants respectively assert that claim 3 is not unpatentable over Asai in combination with Chung and Kinoshita under 35 U.S.C. §103(a), since claim 3 depends from claim 1 and Applicants have argued *supra* that claim 1 is not unpatentable over Asai in combination with Chung under 35 U.S.C. §103(a).

As to claim 4, Applicants respectfully contend that claim 4 is not unpatentable over Asai in view of Kinoshita, because Asai in view of Kinoshita does not teach or suggest each and every feature of claim 4. For example, that claim 4 is not unpatentable over Asai in view of Kinoshita, because Asai does not teach or suggest the feature: "wherein the at least one microvia includes a first microvia, wherein the first microvia passes through dielectric layers M through N, wherein M is at least 2, wherein N is at least 3, wherein M is less than N, and wherein metal plane N is electrically coupled to the first microvia".

The Examiner argues: "".

The Examiner admits that Asai and Chung do not teach or suggest the preceding feature of claim 4. The Examiner alleges that Kinoshita teaches the preceding feature of claim 4. The Examiner argues: "It would have been obvious to one of ordinary skill in the art to form at least one microvia structure, which includes a first microvia that passes through dielectric layers M [2] through N [3] (8b) of Asai wherein metal plane N is electrically coupled to the first microvia and

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a second microvia that passes through a dielectric layers I through M-1 [1] wherein metal plane N is electrically coupled to the first microvia **in order to provide a functionally equivalent contact that enables electrical connection of the outer pattern as taught by Kinoshita** (Col.9, Lines 27-34)" (emphasis added).

In response to the preceding argument by the Examiner, Applicants respectfully contend that the Examiner's argument is not persuasive, because Kinoshita's outer pattern 17, as shown in FIG. 5 of Kinoshita, is already enabled by Asai's disclosure. Indeed, Kinoshita's outer pattern 17 is analogous to Asai's upper conductor layer 9b in FIG. 1 of Asai, and an inspection of FIG. 1 of Asai shows that a connection is enabled between the outer conductor layer 9b and the lower conductor layer 9a, the conductor layer 3, the conductor layer 4, etc. Thus, it would not be obvious to one of ordinary skill in the art to utilize Kinoshita's first microvia in order to enable electrical connection of Asai's upper pattern 9b which is fully enabled without Kinoshita's first microvia.

In addition, the microvia structure of Kinoshita cannot electrically connect Asai's upper pattern 9b to Asai's lower conductor layer 9a, since the lower conductor layer 9a is displaced to the left and right of upper pattern 9b and does not exist directly below the upper pattern 9b. Thus, the microvia structure of Kinoshita is geometrically incompatible with Asai's inventive structure.

Furthermore, a fundamental aspect of Asai's invention is generating via holes 11. Thus, replacing via holes 11 of Asai's electrical structure in order to accommodate the microvia structure of Kinoshita would destroy this fundamental teaching of Asai.

Based on the preceding arguments, Applicants respectfully maintain that claim 4 is not

unpatentable over Asai in view of Kinoshita, and that claim 4 is in condition for allowance.

Since claims 5-6 and 58-59 depend from claim 4, Applicants contend that claims 5-6 and 58-59 are likewise in condition for allowance.

**35 U.S.C. §103(a): Claim 14**

The Examiner rejected claim 14 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai (US 6,384,344) and Chung (US 6,376,769) as applied to claim 1 and further in combination with Applicant's Admitted Prior Art (APA).

Applicants respectively assert that claim 14 is not unpatentable over Asai in combination with Chung and Applicant's Admitted Prior Art under 35 U.S.C. §103(a), since claim 14 depends from claim 1 and Applicants have argued *supra* that claim 1 is not unpatentable over Asai in combination with Chung under 35 U.S.C. §103(a).



**35 U.S.C. §103(a): Claims 15 and 16**

The Examiner rejected claims 15 and 16 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai (US 6,384,344), Chung (US 6,376,769) and APA as applied to claim 14 and further in combination with Bhatt (US RE37840).

Applicants respectively assert that claims 15 and 16 are not unpatentable over Asai in combination with Chung and Applicant's Admitted Prior Art and further in combination with Bhatt under 35 U.S.C. §103(a), since claims 15 and 16 depend from claim 1 and Applicants have argued *supra* that claim 1 is not unpatentable over Asai in combination with Chung under 35 U.S.C. §103(a).

**35 U.S.C. §103(a): Claims 24 and 25**

The Examiner rejected claims 24 and 25 under 35 U.S.C. §103(a) as allegedly being unpatentable over Asai (US 6,384,344) and Chung (US 6,376,769) as applied to claim 22 and further in combination with Bhatt et al. (US RE37840E).

Applicants respectively assert that claims 24 and 25 are not unpatentable over Asai in combination with Chung and further in combination with Bhatt under 35 U.S.C. §103(a), since claims 24 and 25 depend from claim 1 and Applicants have argued *supra* that claim 1 is not unpatentable over Asai in combination with Chung under 35 U.S.C. §103(a).

**CONCLUSION**

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below.

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